

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### NO DRAWINGS

#### Recovering Fibrous Materials and/or Synthetic Resin from Waste Paper

WE, O. DORRIES A.G., a German body corporate of Duren, Germany, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a process for the recovery of materials from waste paper and/or similar fibrous products, e.g. paperboard and cardboard, which are coated with synthetic resins or faced or laminated with synthetic resin foils.

Although processes are known for treating fibrous material waste which are impregnated with synthetic resins or are sized in the pulp, such processes usually operating by the wet method and utilising various chemicals and/or heat and/or pressure, no regeneration process so far exists for fibrous waste material which is coated with synthetic resins in the form of a rigid film. It makes no difference how this film has been produced on the fibre base, whether applied by solution or dispersion or as a foil by means of a facing or extrusion coating.

The only use of such waste products hitherto has been in the exploitation of their fuel value. As regards the practical processing of paper waste, this means that these paper waste products must be sorted out from the other exploitable material by a costly and time-wasting method. Furthermore, a large quantity of fibrous material is in this way lost for a more economic exploitation.

The shredding of plastics-coated papers while dry in such a fine form that the shredded material can serve directly as an initial material for the manufacture of paper or cardboard has already been considered. However, a fibrous material containing specks is obtained in this way. The specks

consist mainly of small particles of synthetic resin to which the fibres adhere, and these particles prevent the processing of the worked-up fibrous material into paper or paper board of sufficiently good quality.

The invention has for its object the provision of a process which enables the fibres to be detached completely from the synthetic resin and which breaks up the latter only into particles of a size, which can be segregated in a less complicated manner from the substantially more finely dispersed fraction of fibrous material.

According to this invention, there is provided a process for the recovery of fibrous material and/or synthetic resin from paper and/or paperboard and/or cardboard waste products coated, faced or laminated with a film or films of synthetic resin, such process comprising exposing the waste products in a moist or wet condition, i.e. containing at most 70% by weight of water, to a vigorous mechanical treatment in a shredding apparatus, whereby complete detachment of synthetic resin from fibrous material is achieved, the fibrous material being broken down into individual fibres while the synthetic resin film remains in relatively large pieces.

We have found that a complete and selective separation of fibrous material and synthetic resin can be achieved if the coated, faced or laminated paper, paperboard or cardboard waste products are treated in a moist condition in a shredding appliance.

Under these circumstances, because of the different interfacial forces between the hydrophylic fibrous material and the hydrophobic synthetic resin, segregation of the two components is achieved by the fact that the layer of fibrous material, once it is initially detached from the synthetic resin film, offers only quite a small resistance to

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being broken down into separate fibres, but the synthetic resin film, as soon as it no longer attached to the fibrous material, is not subject to a further comminution because of its high flexibility. The product of the treatment according to the invention is a mixture of fibrous material substantially broken down into individual fibres and comparatively large particles of synthetic resin film, which can readily be segregated from the fibrous material by the use of known sorting and cleaning devices.

The moistening of the waste products may advantageously be carried out prior to the introduction of the waste products into the shredding apparatus, preferably by steeping the products in water, conveniently with the addition of small quantities of wetting agents, or by pretreatment with steam.

Alternatively water or steam may be introduced directly into the inlet of the shredding apparatus. It is of importance that the proportion of water be kept as low as possible, so that the mechanical forces during the shredding can be fully operative on the paper material.

The shredding apparatus is preferably such as to permit shredding of waste products containing advantageously above 30% by weight of dry paper material and not more than 70% of water, since by this means the internal friction of the paper particles producing the detachment of the synthetic resin film is strengthened. Therefore, disc-type refiners are eminently suitable for this purpose.

It is possible to use the recovered fibrous material for the manufacture of paper, paperboard or cardboard and also the recovered synthetic resin for the production of foils or films.

#### WHAT WE CLAIM IS:—

1. A process for the recovery of fibrous

material and/or synthetic resin from paper and/or paperboard and/or cardboard waste products coated, faced or laminated with a film or films of synthetic resin, such process comprising exposing the waste products in a moist or wet condition, i.e. containing at most 70% by weight of water to a vigorous mechanical treatment in a shredding apparatus, whereby complete detachment of synthetic resin from fibrous material is achieved, the fibrous material being broken down into individual fibres while the synthetic resin film remains in relatively large pieces.

2. A process according to claim 1 wherein the pieces of synthetic resin film are segregated from the fibrous material.

3. A process according to claim 1 or 2. wherein moistening of the waste products is carried out prior to the introduction of the waste products into the shredding apparatus.

4. A process according to claim 3, wherein the waste products are steeped in water.

5. A process according to claim 4, wherein a small quantity of one or more wetting agents is added to the said water.

6. A process according to claim 3, wherein the waste products are moistened by steam.

7. A process according to claim 1 or 2, wherein the waste products are moistened in the shredding apparatus by the introduction of water or steam directly into the inlet of such apparatus.

8. A process according to any preceding claim, wherein the mechanical treatment is carried out in a disc-type refiner.

9. A process according to claim 1 substantially as hereinbefore described.

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